DOCUMENT RESUME

ED 195 321 PS 011 521

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TITLE Cognitive Based Programming for the 3, 4, and 5 Year Old and Application to Later Reading Skills.
PUB DATE Apr 80
NOTE 12p.: Paper presented at the Annual South Central Conference on Early Education for the Handicapped (2nd, Springfield, MO, April, 1980).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Development: Early Childhood Education: Home Instruction: *Language Experience Approach: *Prereading Experience: *Preschool Children: *Reading Readiness: *Science Activities: Science Education

ABSTRACT

Parents and teachers are encouraged in this paper to provide home and school cognitive science activities to help their preschool-age children develop prereading skills. Many of the activities mentioned could be introduced prior to the age of 3 years and all by the age of 5 years. In general, activities that develop cognitive skills should precede activities that develop reading skills. While using a variety of materials in hands-on activities, preschool children should be encouraged to talk expressively as they acquire experience with classification, seriation, spatial positions and relations, and relations of temporal data schemes. Natural science activities can be linked to language activities such as dictated stories and activity records. This cognitive science approach to home and school learning activities includes informal guidelines for implementing a five-step procedure that leads children to read and write. The procedure begins with a discussion of water and ends with children writing their own brief compositions. Intermediate steps include picture collection, modeling the writing of children's spoken sentences on a chalkboard, and work copying activities. (Author/RH)

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Cognitive Based Programming for the 3, 4, and 5 Year Old and Application to Later Reading Skills

Presentation to: Second Annual South Central Conference on Early Education for the Handicapped

Springfield, Missouri April, 1980

Experiences in kitchen chemistry, back yard biology, and family room physics, and other simplified science activities may be the sources for helping children develop many substructure or pre-reading skills that will enable them to easily enter into reading. Where else other than in the home, or what content area other than science, are relevant teaching materials and opportunities abundant for developing cognitive/thinking skills?

To provide for those learnings the home and school cognitive science curriculum must include the following schemes:

1. Classification Schemes. Children learn to recognize relevant features of three dimensional objects or sounds made by those objects or sounds made by those objects and their similarities or differences.
2. Seriation Schemes. Children learn to use relevant configurational data, personal preferences, familial or societal values, in addition to counting, to order three dimensional objects by size, quality, or quantity.

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3. Spatial Positions and Relations Schemes. Children learn to perceive objects viewed and sounds heard in relationship to themselves. In these activities, concepts and meanings of prepositions, verbs, and nouns will be learned.
4. Relations of Temporal Data Schemes. Children learn the principles of time sequence and chronological order. Concepts of beginning, ending, when, how long, departure, arrival, and intervening events, as well as other time related concepts are provided.

A variety of activities in which children manipulate, experiment with, and explore three dimensional objects, pictures, environmental stimuli, and language must be provided. The ultimate outcome of the activities will be the children's development of verbal and nonverbal, receptive and expressive language proficiencies. Activities will include visual imagery building in which children learn to mentally imagine objects, sounds, movements, and sensations. After the initial imageries learned, children should be provided with experiences in which they complete partial representations that are presented.

Children should expand their imagery abilities by constructing models of clay and continue in receptive and expressive language development. From that point children should enter into activities in which they use scientific equipment (from the kitchen and yard) and movements to learn procedures (cooking jam), observe (watching a bird build a nest), collecting and categorizing (types and sizes of rocks and minerals), and work with ob-

jects that make distinguishable sounds (loudness, pitch, etc.). Provisions for tactile/kinesthetic activities in which all of the children's sensory modalities are utilized must form a large portion of the home and school cognitive science curriculum.

The children will continue to explore, discover by observing, and collect. Each activity should be accompanied by a verbalization component to insure that both verbal and nonverbal language skills are being developed. However, parents and teachers must distinguish between children's thinking or cognitive competences and their language production. They may learn many scientific rules and principles prior to their abilities to use language to explain them.

In the kitchen children can learn to cook or prepare simple food (pudding, jam, cookies, etc.). They can also observe chemical reactions (mixing soda and vinegar, dropping soap into oil floating on water). They can help classify and organize food on the pantry and refrigerator shelves. Concepts of letter sounds can be emphasized by verbalizing the categorizations of pots, pans, popcorn, peanut butter, etc. Only a lack of parents' and teachers' imagination can limit the number of learning activities in the kitchen. When chickens and fish are cleaned, the children should observe. Showing them the insides of stomachs, hearts, and gizzards and other anatomical parts is excellent.

In the yard, several types of bird feeders offer excellent observational sources. Birds can be classified by size, color, eating habits, song, and nesting habits. Records can be kept of the frequency with which they visit the site. Blue bird, wren, and other birdhouses can be constructed. Simple windmills can be erected for determining wind speed and direction. Kites can be flown. The air is full of scientific information and so is the ground. Roots can be uncovered and studied, as can worms, ants, and other creatures. Plants that are growing, planting seeds, rooting twigs are all within the realm of the young child's ability to understand.

Many of the activities mentioned could be introduced prior to the age of three years and all by the age of five. As the children grow and develop in oral language production, listening and visual acuity and discrimination, memory, cognitive and intellectual efficiency, and physical abilities, they may be introduced to letter sounds and names (first by saying and hearing; later by first letter labelling of pots, table, etc.). That can be extended by labelling objects with words. As the simple skills are learned, each letter (t for instance) can be placed in a book. The children can cut pictures from a catalog or newspaper that begin with t: table, telephone, television, trunk, top, tub, towel. The parent or teacher can write the word under each picture.

The children can also maintain a daily diary or record of their activities. Each page would contain the day and date.

Simple stories would be dictated by the child and written by the parent or teacher. The stories should be accompanied by pictures. Undue stress should not be placed upon the children to remember all the words or to read, especially in the initial stages. The cognitive abilities that are reflected by the child's speech and the concepts the children develop about reading and their attitudes toward reading are of more importance.

When writing the stories that are dictated, they should contain only a few short sentences. They should contain a subject and predicate, in that order. The words should be highly repetitive and predictable. Children should never be pressured or unduly required to read them. Too much or the wrong kind of pressure on young children has been shown to result in negative attitudes.

The first and major emphasis should be on young children's abilities to identify, classify, grade, or rank the attributes of objects and sounds then classify those objects into groups. Next, concepts and skills in sequencing must be learned. Observing and learning transformations, transfiguration, and reorganization schemes are also important learnings. Finally, making predictions and drawing conclusions are skills that are very necessary. All of those must be learned cognitively prior to requiring children to perform them by reading.

The activities presented in this paper could be developed to serve as a non-printed materials approach to teaching be-

ginning reading. However, the activities would probably serve best as a supplementary program to the reading approach currently in use.

The Transition to Reading, Step by Step

Specific procedures, that would include the aforementioned ideas, to lead the children to reading and writing, are as follows:

Step 1. A lively discussion of water (includes some or all of those ideas presented earlier).

Step 2. Providing the children with magazines from which they cut pictures of various pictures of water in different forms. The pictures are pasted on a page. The teacher writes one word, on the page for each child. Later the children may dictate a sentence (main idea) about a picture which the teacher will write. At the appropriate time, the children will be allowed to write their own sentences. Child could also draw the pictures.

The pictures could be used for bulletin board displays, collected by the child and placed in science notebook under W for water, or used in many of the discussion sessions recommended earlier in this paper.

Step 3. When children are able to see the chalkboard and have developed a concept of words and reading (which is vital!), then the teacher may begin a stimulating discussion

and at the ideal moment, ask, "Who can tell me what we did today? I want to write it on the board."

". . . made frost." A child may answer.

To insure that correct syntactical patterns are being developed, the teacher should respond, "Yes, John, that's good! Could you say it again and begin with the word today?" (If teachers say, "Make a complete sentence," the children may not have developed that concept).

John replies, "Today we made frost."
"Great!" Replies the teacher. "Everyone watch as I write what John said on the chalkboard."

Today we made frost.

"Who can tell me what we did first?" Questions the teacher.

This procedure continues until a short simple story similar to the one below is written:

Today we made frost.
First we got a can.
Next we put ice in it.
Then we put salt in the ice.
Soon, frost was on the outside of the can.

It is important that questions, discussion, and interaction occur prior to and during the writing. It is essential that children see the words being written. The stories must begin with a main idea. The teachers should guide children to produce sentences that support the main idea. The sentences may be details, ordered (as in the example), characteristics or descriptions, comparisons or contrasts. As much as possible words should be repeated (we, put, and in, in the example) large words should not be eliminated. A child can learn electricity and generator easier than discriminating between those and these in the early stages of development.

In the initial stages, children should not be required to learn any of the words. They should observe first. As the teacher determines that the children can be successful, they may read the short selections in unison. Following that, individual children who volunteer should be allowed to read the selection. Those children may also lead the choral (unison) reading.

As children become adept at reading the selections, the teacher may copy the stories on cardboard and cut them into sentences (first) and words (after sentences are mastered) then allow the children to reconstruct them on a board with slots to hold the sentence and word strips.

Step 4. When children are able to write, their first experiences should be in labeling pictures, then copying sen-

tences, and later, copying the language experience stories from the board. Of course, certain prewriting skills should precede formal requirements for handwriting.

When each child has developed sufficient abilities to copy words and remember the letters in other words, they may be allowed to write independently. A good way of doing that is to begin by allowing children to write their own title to the story. Later, the teacher may guide and direct all of story but the last sentence, then allow the children to create their own endings. That may be prefaced by asking the children to think of how they would end the selection and if they wish for the teacher to write any words they will need on the chalkboard.

At this level children will misspell words, reverse letters and words, and omit the same. Overconcern of the teachers toward these matters which are natural may stifle the children's desires to produce.

Step 5. Children will become able to write their own compositions. They can express what was observed, what they did during an experiment, or write directions for others to follow.

Conclusions

Science can be fun. Science can be exciting. But before reading and writing about science, children's substructure physiopsychological development must be well developed. And

too, even though this paper contains suggestions for using science as a medium for teaching beginning reading, the authors have observed that once children have begun the formal study of science in textbooks that science is taught more as a reading subject than the dynamic, living content area that it is. Science should not be taught solely as a reading-based, verbal-symbols information gathering system.

Perhaps if early childhood educators and elementary teachers could place more emphasis on discovery and inquiry techniques and stress cognition, evaluation, as well as divergent and convergent thinking processes, then children would develop more interest in studying science and in using science as a survival tool in their daily lives.

The language experience methods described in this paper were presented briefly. The bibliography contains work that have complete directions for the process (Layton, 1979; Range, Roubinek, and Layton, 1980).

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James R. Layton recently published a book entitled The Psychology of Learning to Read, and Dale G. Range, James R. Layton, and Darrell L. Roubinek recently published a book entitled, Early Childhood Education: Theory to Research to Practice. Both books are available from Academic Press, 111 Fifth Avenue, New York.